IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor:	Pierre C. Delago	Docket: 14622.01
Application No.:	10/786,202	Confirmation No. 3040
Filing Date:	February 25, 2004	Examiner: Thomas J. Brahan
Title:	CRANE RADIAL SUPPORT BEARING	Group Art Unit: 3654

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

APPELLANT'S REPLY BRIEF

Dear Sir:

This Reply Brief is filed in response to the Examiner's Answer mailed on June 26, 2008. The following comments are made in response to the arguments raised in the Examiner's Answer. Applicants also maintain the arguments presented in their Appeal Brief.

I. Wampach's Rollers 41, 44 Carry the Significant Boom Loads, Not Rollers 34

In the Examiner's Answer, the Examiner states that "all of (sic) rollers in Wampach carry a load, even the vertically disposed rollers (34)" (Answer at p. 5) and that "all the rollers of these combined roller and thrust bearing arrangements carry some loading" (Answer at p. 6).

However, the Wampach reference itself does not support the Examiner's contention as to rollers 34. In a crane, the forces of primary interest are those from carrying a load at or near the boom tip. Wampach does not describe rollers 34 as structures for such boom loads, but instead describes them as anti-friction rollers provided to facilitate rotation of the swing bed 5 around the hub 33: "The swing bed 5 is mounted for relative rotation on the truck frame 2 about the vertical

axis *a-a*, and is rotatably supported on the hub 33 by a plurality of anti-friction rollers 34, retained in rolling contact with the periphery of the hub 33 by an annular member 35 secured to a plate 36 by such means as bolts or screws 37." Wampach at col. 4, lines 44-49. In contrast, Wampach clearly describes the function of rollers 41 and 44 in carrying the load of swing bed 5, which supports both boom 8 and house/cab 6/7: "The weight of the swing bed is carried directly upon plate 28 of the truck frame by suitable anti-friction rollers 41, shown rotatably mounted on radial supporting pins or rods 42. . . . To prevent the swing bed from relatively tilting upon the truck frame, a plurality of hook rollers 44 are rotatably mounted on short shafts 45 secured to an annular member 46 having its upper edge suitably fixed to the plate 36 by such means as welding." Wampach at col. 4, lines 61-64, lines 72-72, and col. 5, line 1. Thus, the description provided by Wampach itself does not support the Examiner's contention concerning the load-bearing function of anti-friction rollers 34.

Moreover, even assuming *arguendo* that rollers 34 carry some load, it is clear from the description and function of the Wampach design that these rollers are not intended to perform any significant boom load-bearing function. The boom loads in the Wampach crane cause tilting forces countered by opposed rollers 41 and 44, both with horizontal rotational axes and acting on plate 28, as described in detail and illustrated on pp. 11-12 of the Appellant's Third Amended Appeal Brief. The vertical axis rollers 34 asserted by the Answer to be comparable to Applicants rollers 105 largely serve to maintain the concentricity of the axis of roller groups 41, 44 relative to the Wampach's swing bed axis a-a. The rollers 34 thus assist when the truck moves or wind or forces other than boom loads are encountered.[1]

A fundamental difference between Wampach's non-chained friction rollers 34 and Appellant's chain of rollers 105 is that anchoring Appellant's chained rollers on superstructure 20 permits the chain to be tensioned against post bearing surface 5, causing Applicant's boom radial loads acting at boom feet 22 to be borne, mainly, as tension in Appellant's roller chain. The rollers 105 distribute that load equally into post bearing surface 5. No such boom radial load

[1] Appellant's characterization of forces at rollers 34, 41, 44 is not "just conjecture" or "speculative" as the Answer suggests; a person skilled in the art can understand from Wampach's specification and drawings how its boom loads are carried.

distribution is possible with Wampach's rollers 34, because annular member 35 contains the rollers 34 and determines how they contact hub 33.

II. Claim 56 Recites Substantial Symmetry of the Roller Chain Relative To the Vertical Plane of Boom Motion

The Answer notes Appellant's argument that "Kaltenbach does not teach or suggest a roller chain positioned for substantial symmetry relative to a vertical plane of boom motion" but states "this symmetry is not recited in claim 56" (Answer at p. 6).

To the contrary, claim 56 recites: "the first and second anchors being positioned to make the arc of the roller chain substantially symmetrical with respect to the vertical plane of boom motion." Roller chain symmetry relative to the boom vertical motion plane is a feature of the combination of claim 56 not found in the cited prior art. As Appellant's boom 10 and superstructure 20 rotate around the post bearing surface 5, the tensioned roller chain moves with the boom and superstructure, spreads the radial forces from the boom across the arc of rollers 105 and delivers compressive forces at moving contact points on the post bearing surface 5.

III. Kaltenbach's Rollers Are Not Symmetrical Relative to Any Boom Plane of Vertical Motion

The Answer appears to confuse the symmetrical positioning of the roller chain 100 relative to the vertical plane of boom motion with the spacing of the individual rollers included in the chain. Specifically, the Answer states:

> Appellant argues . . . that "the positioning of the anchor levers 29 in Kaltenbach is not explained" and calls the placement of the roller chain as (sic) "asymmetrical." This is wrong. Kaltenbach shows equally spaced rollers. They are not asymmetrical.

(Answer at p. 7).

Appellant's arguments cited in the Answer address the position of each of Kaltenbach's two semi-circular roller chains anchored at Kaltenbach's levers 29 with respect to a vertical plane defined by boom raising/lowering motion. (Kaltenbach's horizontal, counter-balanced boom 10 does not have a real vertical plane of boom motion.) However, the Answer's comments

above do not address the position of either Kaltenbach semi-circular roller chain relative to the boom; rather the comments address the inter-roller spacing within a Kaltenbach roller chain. While Kaltenbach's rollers appear equally spaced, that is not germane to the symmetrical positioning of the "arc of the roller chain" claimed in the present application. The invention as recited in claim 56 recites that "the first and second anchors [are] positioned to make the arc of the roller chain substantially symmetrical with respect to the vertical plane of boom motion." See Appellants Fig. 7, showing from above essentially one-half of the symmetrical roller chain 100, anchored at symmetrical brackets 155 (only one being visible in Fig. 7). It is the position of the roller chain arc with respect to the vertical plane of boom motion, and not the spacing of the individual rollers within the chain, that is the subject of the Appellant's arguments on claim 56.

As discussed in detail in Appellant's Third Amended Appeal Brief at pp. 14 and 18-19, Kaltenbach does not teach or suggest a roller chain that is positioned symmetrically with respect to the vertical plane of boom motion. This may in part be because Kaltenbach has a horizontal, counter-balanced boom and has no real vertical plane of boom motion.

IV. Goss et al. Do Not Teach or Suggest a Roller Chain

The Answer states that "Goss et al has the exact claimed arrangement of a roller chain along the boom side of the bearing hub and two larger rollers spaced along the side opposite of the boom." (Answer at p. 7).

It is respectfully submitted that Goss does not teach <u>any</u> roller chain. Goss instead teaches two roller pairs R (114 and 115, 122a and 122b) each fixed to a mounting plate (116, 118, and 124) that are provided "to facilitate rotation of the platform 16 about the midsection 10c of the pedestal 10." Goss at col. 5, lines 37-39. Additionally, two idler rollers 130 and 132 are positioned on the opposite side of the boom from the fixed rollers 114, 115, 122a and 122b. These rollers are not in a pivotally linked sequence forming a chain.

Thus, Goss does not teach or suggest the roller chain recited in claim 56 that encompasses at least a segment of the post bearing surface and comprises a plurality of rollers arranged in a pivotally-linked sequence, with first and second anchors coupled to the crane superstructure and operably, pivotally-linked to the first and last rollers respectively. Further,

Appellant's first and second anchors are positioned to make the arc of the roller chain substantially symmetrical with respect to the vertical plane of boom motion and to tension the rollers against the post bearing surface 5, whereby "the pivoting action of the rollers maintains substantially equal distribution of radial loads from the boom [10] across all rollers in the roller chain [100]" for delivery into post bearing surface 5. Goss alone or in the cited combination does not teach or suggest this.

V. The Proposed Combination of and Modification of Wampach and Kaltenbach is Not Proper

If the proposed modification or combination of prior art asserted for a Section 103 rejection would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. M.P.E.P. §2143.01(VI).

As discussed in the Appellant's Appeal Brief, there are fundamental differences in the crane structures and load bearing principles taught by Wampach and by Kaltenbach. Both Wampach and Kaltenbach describe cranes that experience overturning forces when loaded; but their differences in handling the load forces are such that their combination in the manner asserted, i.e., converting Wampach's unlinked, ring-contained (ring 35), anti-friction roller set 34, which does not carry significant overturning forces, into Kaltenbach's linked rollers that carry such forces but in a crane having a fundamentally different design, would necessarily require substantial reconstruction and redesign of the Wampach crane.[2] Accordingly, the asserted combination of the Wampach crane and the roller chain of Kaltenbach is not sufficiently supported to render claims 56-69 *prima facie* obvious under § 103.

One way of seeing the differing structures of Wampach, Kaltenbach and Appellant, is to recognize that Wampach has a boom load triangle formed with the tensioned boom cable 10 as one leg, the boom 8 in compression as the second leg and the swing bed/housing/cab structure between boom pivot 9 and the sheave at the bottom of boom cable 10 as the third leg. At any

[2] In addition to linking rollers 34 in a chain, at least the following reconstruction would be required: the structure of Wampach's opposed rollers 41, 44 and plate 28, would have to be removed, so that the tilting forces would be available to be applied to rollers 34; anchoring for the linked rollers 34 would need to be introduced; and ring 35 would need to removed, to free the linked rollers to interact.

given time when lines 10 are not moving, the triangle is rigid. The load at Wampach's boom tip tends to tilt the boom load triangle by pulling the boom tip down. Wampach's opposed rollers 41, 44 and plate 28 act at and outside the third leg to counteract the tilting tendency. Wampach's rollers 34 help the loaded rollers 41, 44 and the triangle spin about the hub 33, but do not change the leg connections that form the basic load triangle

Kaltenbach has no comparable load triangle. Rather it has a first, outer, inverted cone (skirt 15) bearing the horizontal, counter-balanced boom 10. The first cone is supported for rotation at a bearing at the top of a second, inner cone (tower 13) located within the first cone. Kaltenbach's two semi-circular roller sets (rollers 26) mediate the contact of the lower edges of the two cones. Any tilting force from an unbalanced boom load, travels along the horizontal boom 10 and down the outer cone to be applied to the inner cone. Thus, Kaltenbach's load-bearing structure is fundamentally different than Wampach, which resists tilting of its load triangle by structures restraining the swing bed/housing/cab leg of Wampach's load triangle.

Appellant also has essentially a load triangle, with tensioned cables 25 forming one leg and boom 10 in compression forming a second leg, but the third leg of Appellant's triangle, opposite the load bearing apex, includes the stationary load bearing post 5. The superstructure 20 anchoring the roller chain 100 at the lower end of post 5 and the swivel post head 15 permit the cable 25 and boom 10 legs to rotate freely around the post 5 serving as the third leg of the load triangle. Appellant's roller chain 100 not only bears radial loads from the boom 10 but allows those loads to be dynamically transferred during boom rotation to the triangle side (stationary post 5) opposite the load-bearing apex. Thus, although each has a load triangle, Appellant and Wampach are fundamentally different in the ways their structures resist the tilting forces caused by boom loads at their respective triangles and the way boom loads are carried to the stationary members ultimately supporting the cranes.

In sum, combining Kaltenbach with Wampach to get a structure as claimed in Appellant's claim 56 is possible only with fundamental reconstruction and redesign of the Wampach crane, guided by Appellants teachings.

CONCLUSION

For the reasons set forth above, as well as those set forth in the Appellant's Appeal Brief, Appellant respectfully requests reversal of the Examiner's rejection of claims 56-69 under 35 U.S.C. § 103(a).

Should any additional fees be necessary, the Commissioner is hereby authorized to charge any fee deficiency associated with this paper or request to Deposit Account No. 04-1420.

Respectfully submitted,

DORSEY & WHITNEY LLP
Customer Number 25763

Date: Aug. 25, 2008

By: [signature]
Stuart R. Hemphill, Reg. No. 28,084
(612) 340-2734